Hepatitis B:
A Concern for NIH Employees

What causes hepatitis B?

The hepatitis B virus is one of several causes of viral hepatitis. The virus enters the body through breaks in the skin or across mucous membranes, and damages the liver. The virus that causes hepatitis B, formerly called "serum hepatitis," may be found in all body fluids and secretions of an infected individual. It may be transmitted by blood transfusion, sexual contact, mucous membrane exposure, or puncturing of the skin by contaminated instruments such as those used for medical and dental procedures, tattooing, ear piercing, and acupuncture. Pregnant women may also pass the infection to their newborn infant.

What are the symptoms of hepatitis B?

Hepatitis B symptoms range from non-existent to severe. At one end of the spectrum, more than half of individuals infected with hepatitis B have no symptoms at all, or very mild symptoms. At the other extreme, the acute symptoms include severe fatigue, fever, chills, nausea, vomiting, loss of appetite and generalized muscle aches. These symptoms may seem like the flu but tend to last longer. In addition, the patient may have a tender liver (tenderness in the upper right side of the abdomen) and may exhibit jaundice (yellowing of the skin and whites of the eyes).

How dangerous is hepatitis B?

Most people recover completely from viral hepatitis B, but the infection may incapacitate a person for weeks or months during the acute phase. Out of every 100 cases of hepatitis B, about one person develops severe liver disease, or fulminant hepatitis, which may result in death. Five to ten percent of adults who acquire hepatitis B infection develop a chronic infection and become chronic carriers. The risk of chronicity is higher for infected children, with up to 90 percent of newborns and 50 percent of pre-schoolers becoming chronic carriers. Although most chronic carriers have no symptoms, almost all have biopsy evidence of chronic hepatitis and some may progress to more severe forms of liver disease, including cirrhosis and liver cancer. The risk of a hepatitis B carrier developing liver cancer is more than 30 times greater than the risk of a cigarette smoker developing lung cancer.

Are there any other hidden risks of hepatitis B infection?

Because most individuals infected with hepatitis B do not have any obvious symptoms, the disease poses hidden risks to both infected persons and their contacts. Infected persons, even though they themselves may have no symptoms, may transmit the disease to others, such as family members, close friends, and healthcare workers. Infection in a pregnant woman may result in chronic infection of her newborn. The likelihood of transmission from mother to newborn depends on the level of hepatitis B virus in the mother's blood; up to 90% of newborns born to highly infected mothers are themselves infected and become chronic carriers. When infected female infants reach child-bearing age they perpetuate the risk of maternal-fetal transmission.

Can hepatitis B infection be cured?

Most infected individuals recover from acute infection as a result of their natural

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defense mechanisms; current treatments have limited efficacy for those who develop chronic hepatitis. A genetically engineered form of an immune system protein, called interferon alpha, has recently been approved for the treatment of chronic hepatitis B infection. The drug improves liver function in some patients and helps decrease symptoms, but it may also cause side effects such as fever, headache, and flu-like symptoms. Some treated patients show no improvement, and others show early improvement but then relapse. Another drug, lamivudine, has recently been approved for treating chronic hepatitis B. Combination therapy with interferon alpha and lamivudine appears promising, although relapse after stopping treatment is common. Without a real cure for the infection, the best way to reduce illness and death from the hepatitis B virus is to prevent infection.

Are NIH employees at risk for acquiring hepatitis B?

Historically, hepatitis B has been the leading occupationally-acquired illness among healthcare workers. In 1983, the peak year, approximately 15,000 United States healthcare workers whose jobs entailed potential exposure to blood became infected with hepatitis B. Currently, the Centers for Disease Control and Prevention (CDC) estimate the number of newly infected healthcare workers has fallen to 400 per year. Four hundred workers a year is still too many.

The patients at the NIH Clinical Center present a risk of infection to health professionals because of the large number of known chronic carriers. There are over 1200 known hepatitis B carriers in our patient population. These represent the **known** risk; there are certainly many other patients who are carriers of the virus who have not been identified because they have never been tested. The NIH employee who comes in contact with human blood or body fluids is at significantly greater risk for acquiring hepatitis B than the non-healthcare population. Examples of the many ways that employees may acquire hepatitis B on the job include needlestick injuries or splashing blood or blood products on an open cut, abrasion or mucous membrane.

How can healthcare workers reduce their risk of acquiring hepatitis B?

Healthcare workers can decrease their risk by practicing Universal Precautions in their contacts with all patients and their blood and body fluids. Universal Precautions involve engineering and work practice controls and the use of barriers, such as gloves, gowns, masks and eyewear, to avoid contact with patient blood and body fluids. Workers with occupational exposure to blood or other potentially infectious materials are required to receive annual training in Universal Precautions. Injuries with contaminated instruments must be avoided. Needles and other sharp instruments must be used carefully and disposed of properly in puncture-resistant containers. All needlesticks, puncture wounds, or accidents involving contamination of broken skin or mucous membranes with blood or body fluids should be given immediate first aid and reported immediately to the Occupational Medical Service (OMS). When OMS is closed, report to the emergency room at Suburban Hospital for immediate evaluation and treatment.

Although needlesticks and other obvious accidental exposures to blood and body fluids are efficient ways to acquire this infection, many infections result from less apparent, often unknown exposures. Despite careful questioning, over half of the individuals who have acute hepatitis B can not identify the source of their exposure. The ideal protection method should prevent infection from all known and unknown exposures to the virus, and this protection should be long-lasting. Such protection is available through a safe and effective vaccine that provides immunity to hepatitis B infection. This vaccine will protect you from future hepatitis B infection.

Does the vaccine effectively prevent infection with hepatitis B?

Clinical studies have shown that 90–95% of healthy adults vaccinated become immune by making protective antibodies to the hepatitis B virus. Age has an effect on vaccine response. Younger adults respond better than older adults. Virtually 100% of those who have responded to the vaccine are protected from infection with the virus.

Is the vaccine safe?

More than 1 billion doses of hepatitis B vaccine have been used worldwide. Numerous clinical studies and extensive worldwide use have demonstrated the safety of this vaccine.

In recent years several reports in the lay press without a factual basis have raised concern that the vaccine may be linked to new cases or reactivation of multiple sclerosis (MS) or similar demyelinating diseases. The World Health Organization's Viral Hepatitis Prevention Board (VHPB) convened a panel of experts to review currently available data from numerous sources. The VHPB concluded that available data do not demonstrate a link between hepatitis B immunization and disorders, such as MS.

What are the side effects of the vaccine?

Side effects have been minimal. The most common complaint has been soreness of the arm, which occurs in one of every five vaccinees and typically lasts one or two days. A few individuals have reported headache or fatigue and weakness, and, rarely, low grade fever. Serious allergic reactions are very rare. However, persons who have ever had a severe, life-threatening allergic reaction to baker's yeast or to a previous dose of the vaccine should not receive the vaccine. There have been no long-term reactions associated with the vaccine.

How do I receive the vaccine and what is the cost?

To receive the vaccine, you should call OMS at 496-4411 for an appointment. The clinic, which operates from 7:30 A.M. to 7:30 P.M., Monday through Friday, is located in the 6th floor clinic of Building 10. The vaccine series consists of three doses which are given at day zero, one month, and six months. At day zero, you will be given the first dose and a blood sample will be drawn to test for pre-existing immunity to hepatitis B. If you already have antibody, you are immune and will not need to receive the vaccine. You will be notified by OMS if you have antibody and don't need further doses of vaccine. It is safe to receive the vaccine even if you already are protected. You should make an appointment to return to OMS in one month for the second dose. A computer generated letter will be sent to you at six months after the initial vaccination reminding you to make an appointment to receive your third and final vaccination.

The vaccine cost, as well as all additional administrative and testing expenses, will be paid for by the NIH, for any NIH employee whose job duties may involve occupational exposure to blood or other materials potentially infectious for hepatitis B.

How will I know if I become immune to hepatitis B?

All vaccine recipients are offered blood testing one month after the third dose. These blood samples will be tested for antibody to hepatitis B. This is important information for you to know. Previous studies have shown that a small percentage of vaccinated persons do not respond. If you do not have antibody at your one-month post vaccination testing, OMS staff will inform you so that you are aware that you are still at risk for acquiring hepatitis B infection. Those with a non-protective antibody level will be offered another series of three doses, or an option of additional testing to see if they might already be infected with hepatitis B

(testing for hepatitis B surface antigen, which forms the outer layer of the virus).

Employees who may have received only one or two doses of vaccine in the past should contact OMS to complete the series. Receipt of all three doses and appropriate timing of doses are important to develop high levels of antibody and long-lasting immunity.

What if I do not want to receive the hepatitis B vaccine?

The Occupational Safety and Health Administration (OSHA) standard "Occupational Exposure to Bloodborne Pathogens; Final Rule" recommends that all employees with occupational exposure to blood or other potentially infectious materials receive the hepatitis B vaccine, unless they are already immune or the vaccine is contraindicated for medical reasons. Non-exempt employees covered by the OSHA standard who decline the vaccine are required by the OSHA standard to sign the following declination statement, which will be filed in their OMS medical record:

> *"I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me."*

The risk of infection with hepatitis B is real. At least six unvaccinated NIH employees had documented infections with hepatitis B during the first two years of our vaccine program in the mid 1980s. These infections could have been prevented with successful vaccination. Fortunately, over the last several years the number of occupationally related infections with hepatitis B at NIH has been declining, partly because thousands of employees have now been vaccinated.

Whom do I contact for more information about the hepatitis B vaccine?

If you have additional questions or need more information to decide if you need the vaccine, please call the Hospital Epidemiology Service at 496-2209. To schedule an appointment to receive the vaccine, call the Occupational Medical Service at 496-4411.

Additional information is available on the Web:

Immunization Action Coalition's home page for immunization information and hepatitis B educational materials:
http://immunize.org/index.htm

CDC's Vaccine Information Statement for hepatitis B vaccine:
http://www.immunize.org/vis/hepb99.pdf

Viral Hepatitis Prevention Board's summary statement on the hepatitis B vaccine and MS:
http://esoc-www.uia.ac.be/esoc/VHPB/statement.html

Hospital Epidemiology Service
Occupational Medical Service
Clinical Center, National Institutes of Health

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